

$$H^1(S^1; \mathbb{Z}) = \mathbb{Z}$$

$$\begin{cases} |z_1|^2 + |z_2|^2 = 1 \\ z_1^2 + z_2^2 = 0 \end{cases}$$

$PSL(2, \mathbb{Z})$

$$\begin{aligned} [x, y] &= y \\ [x, z] &= -z \\ [y, z] &= x \end{aligned}$$

$$u: \Delta \rightarrow \Sigma$$

Do in-class mindfulness activities improve student performance?

Josh Thompson
- Northern Michigan University

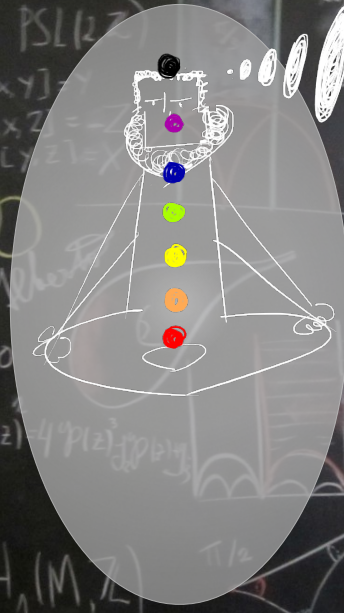
$$H_1(S^1; \mathbb{A}) = \mathbb{Z}$$

$$1 \rightarrow F_2 \rightarrow G \rightarrow \mathbb{Z} \rightarrow 0$$

$$G = \langle a, b \mid a^2 = b^3 \rangle$$

$$p(z) = 4^k p(z)^2 - p(z)^4$$

$$\pi_1(M) / [\pi_1(M), \pi_1(M)] = H_1(M, \mathbb{Z})$$



harmonic



$$\sum_{g \in G} \frac{H(g)}{(g^2 + d)^2}$$



[illegible]



My 1st attempt at mindfulness
in the classroom. (2011)

- one day only
- improvised instruction
- overheard "most awesome thing ever"
- I felt awkward



Northern
Michigan
University

College
Algebra
Section 1

130 students

11:00 am

How do the
two sections
compare?

College
Algebra
Section 2

130 students

2:00 pm

Luke Wolcott's
Suggested Mindfulness
Activities

Mindfulness prompts for math class

developed by Luke Wolcott

forthelukeofmath.com | luke.wolcott@gmail.com

The prompt is changed every Monday in a course that meets MWF. Each week carries over some elements from previous weeks, and adds something new.

Here are four weeks of suggested prompts. After four weeks, I usually pick and choose, add and subtract, with less rigidity. And on any given day, depending on the mood in the room, I may add some lines (e.g. "Start again.") or leave some out.

The instructions are spread out over the time (1.5 to 2 minutes), with plenty of silence.

Week #1: (1min 30sec)

A = {

Sit in a comfortable upright position with your feet planted flat on the ground. Rest your hands on your thighs or on your desk. Eyes open or closed, doesn't matter.

Now just breathe. Refreshing, comfortable and natural breaths.

}

Don't worry about technique, just allow relaxed breaths to enter deeply and exhale fully.

For the next 60 seconds, your task is to focus all your attention on your breathing.

When you're inhaling, notice and feel the inhalation -- in your nose, throat, and belly.

When you're exhaling, notice and feel the exhalation -- in your nose, throat, and belly.

Don't worry about whether you're doing it right.

B = {

When your mind wanders, start again. Patiently and without judgement let go of your thoughts and return your awareness to breathing.

}

You can think those thoughts later, now your job is to focus on the sensations of breathing.

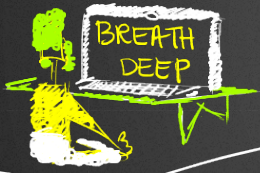
How'd the contemplative practice

— **GO?** —

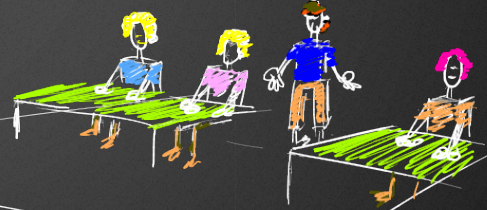
- Most students tuned in & took the practice seriously.
- strange / uncomfortable at first, got better.



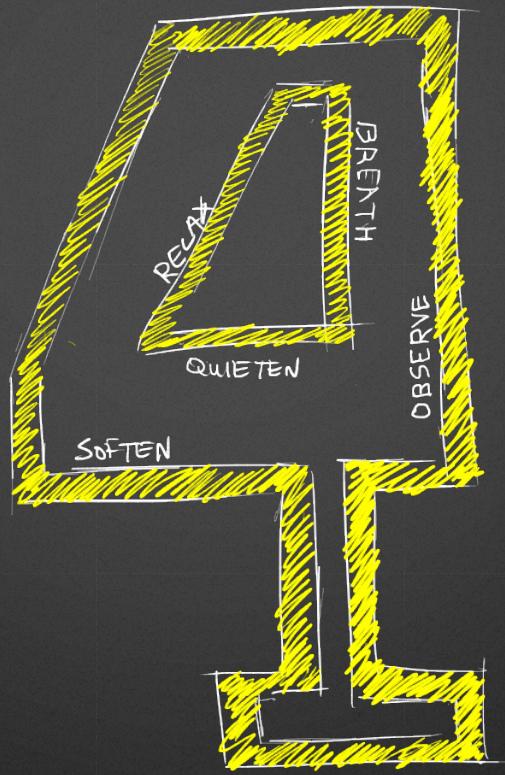
How did the contemplative practices **GO?**



- Worst: I read prompts from screen



- Best: I moved to center of room & improvised



...Am I wasting
their time?

WEEKS

Student Comments

"Indifferent."



"I don't think the (mindless) activity helped."



"It didn't improve my ability..."
"I didn't gain or lose anything."

"Good way to wind down before class."

"It helps with settling..."

"Helped me relax & not be stressed."

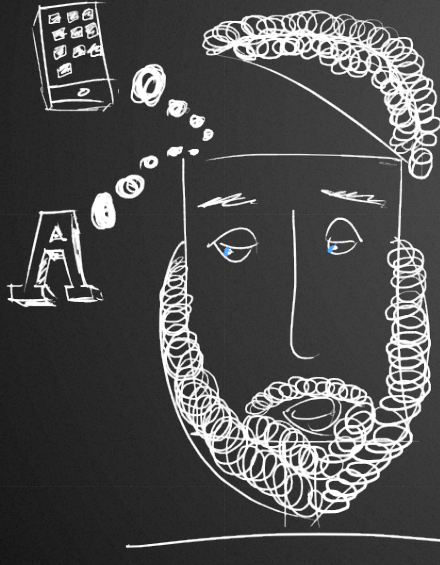
"Can clear the mind & help w/ de-stressing."



Relaxing & good way to start class.

Helps me relax, but difficult so I feel out of control.

"I felt as if I'd done better on last test if we'd done it."



"Relaxing & help clear mind
It's nice to have a moment
to breathe."



"It's like a deep breath before
you start something. It's useful."

"Helps me clear my head."

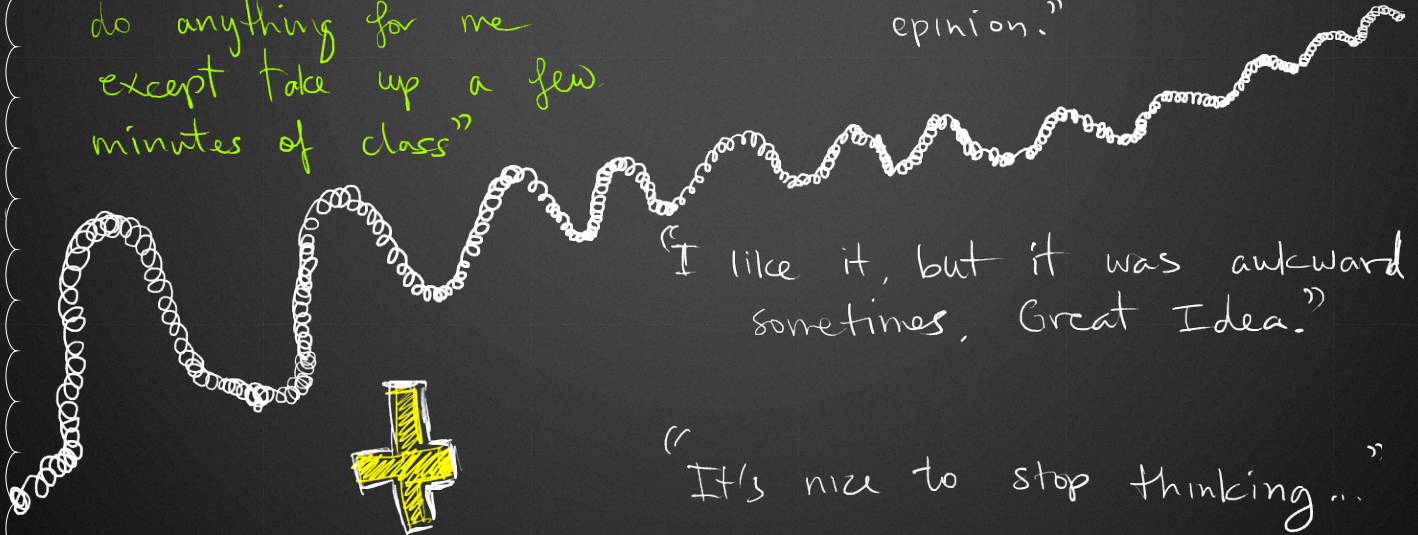
"Takes me away from stress."

"Helps me refocus, take a
break from thoughts trapped
in my head."

"It's a bit weird,
I guess. It can be
calming but it doesn't
do anything for me
except take up a few
minutes of class"



"It isn't making much of
a difference in my
opinion."



"I like it, but it was awkward
sometimes, Great Idea."

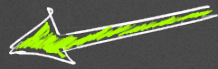
"It's nice to stop thinking..."

GRADE COMPARISON

A B C D E F
+ -

	section	Improved	grade	homework	exam 1	exam 2	exam 3	exam 4	exam avg	final
average	MINDFUL	9	82.8	80.4	83.20	80.13	80.8	82.0	81.9	79.6
			grade	webwork	exam 1	exam 2	exam 3	exam 4	exam avg	final exam
average	normal	2	82.4	83.7	83.93	78.33	82.2	78.6	81.1	80.7
difference			0.33	-3.27	-0.73	1.80	-1.39	3.41	0.84	-1.10
					4-week contemplative practice			RE-DO		

QUESTION?



Did the mindfulness activities contribute to this improvement?



	section	Improved	grade	homework	exam 1	exam 2	exam 3	exam 4	exam avg	final
average	MINDFUL	9	82.8	80.4	83.20	80.13	80.8	82.0	81.9	79.6
			grade	webwork	exam 1	exam 2	exam 3	exam 4	exam avg	final exam
average	normal	2	82.4	83.7	83.93	78.33	82.2	78.6	81.1	80.7
difference			0.33	-3.27	-0.73	1.80	-1.39	3.41	0.84	-1.10
			4-week contemplative practice				RE-DO			

▶ STUDENT RATINGS ▶

- "Grades" given by the students to me
- No one mentioned the mindfulness activities in the end-of-semester evaluations

	A	B	C	D	F
MA111-1	38%	55%	7%	0%	0%
MA111-2	46%	42%	4%	8%	0%

→ The "mindful" class

What I ^{I think} Learned
is important when facilitating
contemplative practices in class.

TIME
(start early, keep it short)

NATURAL
CONFIDENCE

(the students will relax
if you relax first)

ORGANIZED

(you can't read
& be respected)

CONCLUSION

- Students may benefit from in-class contemplation.

Relax + Focus + Perform + Develop Rapport

more
research
needed

- Students will get behind CP if you do it right.

Time + Natural + Organized + Strong Personal Practice + Resources

THANK YOU

<https://contemplativemathematicspedagogy.wikispaces.com/>

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